

Slavonic, Italian, Norwegian, and English being spoken, though all orders were given in Italian. It was well selected, and the ships equipped according to the most approved directions, but still scurvy broke out, though apparently not to so serious an extent as in the case of the *Alert* and *Discovery*. Fresh meat was abundant, and everything known to prevent or counteract the disease, but it broke out in both winters, the men improving during spring. Payer is distinctly of opinion that a judicious use of alcohol is a preventive, but evidently the real cause of this scourge of Arctic explorers has yet to be found out. The lowest temperature met with was a little over 40° R., though the general temperature was much milder. No one suffered seriously from frost bites, though they were common. The single death was due to consumption.

The conduct of the expedition by its two leaders, and the behaviour of officers and men, were all that could be wished. Observations in meteorology and magnetism, on the Aurora (of which there were many magnificent displays), geology, biology, and other departments of science were regularly and carefully made, and will no doubt gradually find their way into the general body of scientific knowledge and deductions. Unfortunately, many of the specimens, geological and zoological, had to be left behind with the ship. On the whole, this expedition is one of the most satisfactory in its conduct and results of all that have gone out to gather knowledge in these inhospitable regions, and Lieut. Payer has written its story in a style not surpassed in fascinating interest and scientific value by any of those old narratives that are still the delight of all who love to read of the adventures of daring men. The translator has had a hard task before him in putting the narrative into English dress, but he has succeeded, we think, completely; while retaining an unmistakable German flavour, the English version is thoroughly idiomatic and readable.

OUR ASTRONOMICAL COLUMN

THE NINEVEH SOLAR ECLIPSE OF B.C. 763.—In the Rev. A. M. Sayce's notice of the discoveries of the late Mr. George Smith amongst the Assyrian inscriptions in the British Museum (*NATURE*, vol. xiv. p. 421), reference is made to a solar eclipse in the month Sivan, which has been fixed to the year B.C. 763, June 15 (not in May, as printed in the notice quoted). The following are elements of this important eclipse—which has so direct a bearing upon the Assyrian chronology of the period—deduced upon the same system of calculation adopted for other ancient eclipses previously alluded to in this column:—

Greenwich Mean Time of Conjunction in R.A., B.C. 763, June 14, at 19h. 9m. 25s.

R.A.	...	...	...	...	73	9	43
Moon's hourly motion in R.A.	...	...	...	...	39	56	
Sun's " " "	...	...	...	...	2	34	
Moon's declination " " "	...	...	...	...	23	10	10 N.
Sun's " " "	...	...	...	...	22	53	4 N.
Moon's hourly motion in decl.	...	...	...	...	0	54	N.
Sun's " " "	...	...	...	...	0	17	N.
Moon's horizontal parallax	...	...	...	...	60	9	
Sun's " " "	...	...	...	...	0	9	
Moon's true semi-diameter	...	...	...	...	16	24	
Sun's " " "	...	...	...	...	15	25	

The sidereal time at Greenwich noon was 4h. 57m. 47s., and the equation of time 8m. 4s. additive to mean time. Hence the middle of the eclipse fell at 19h. 8m. 52s., and the following would be points in the line of central and total phase:—

Longitude	...	35	14 E.	Latitude	...	30	59 N.
"	...	40	2	"	...	32	58
"	...	43	35 E.	"	...	34	19 N.

Sir George Airy places the Pyramid of Nimrud in long. $43^{\circ} 20' 8''$ E., and lat. $36^{\circ} 6' 1''$. Calculating directly for this

point from the preceding elements we find a very large partial eclipse—

Beginning June 15 at	h.	m.	
	7	52	A.M., local M.T.
Ending " " "	10	23	" " "

Greatest phase at 9h. 8m. A.M., magnitude of eclipse 0.987.

The breadth of the zone of totality in the longitude of Nimrud measured upon the meridian was $2^{\circ} 5'$, whence it appears that this point is distant by calculation about 50' outside the northern limit, but at this remote period a very small alteration in the value of the moon's secular acceleration employed would suffice to bring Nimrud within the total eclipse, and it has been inferred that the eclipse was probably total at the station of the Assyrian Court, from the circumstance of the inscription referring to the phenomenon being underlined in the Assyrian Canon or register of annual archons at Nineveh, although there is no interruption in the official order of the Eponymes.

The discovery of the record of this eclipse was first announced by Sir Henry Rawlinson, in May, 1867.

THE COMET OF 1652.—This comet, which was observed for about three weeks only, is stated by Hevelius and Comiers to have equalled the moon in apparent magnitude, a fact pointing to a near approach to the earth. At present we have only the elements given by Halley in his "*Synopsis Astronomiæ Cometicæ*," which were calculated upon the observations of Hevelius, extending from December 20, 1652, to the 8th of the following month, published in the scarce volume of his "*Machina Cœlestis*." From this orbit the following positions and distances result:—

12h. G.M.T.	R.A.	Decl.	Distance from the Earth.
1652, Dec. 12	124 43	-59 18	0.2275
16	96 19	43 42	0.1515
18	81 52	27 2	0.1308
20	69 50	-6 2	0.1314
1653, Jan. 8	33 28	+48 50	0.5627

So that the comet's least distance from the earth was about 0.13 of the earth's mean distance from the sun, and the real diameter of the cometic nebulousity rather less than 110,000 miles.

THE BRIGHTNESS OF JUPITER'S SATELLITES.—In connection with a recent reference in this column to M. Prosper Henry's direct comparison of the brightness of Jupiter's satellites with that of Uranus, it may be mentioned that Dr. Engelmann of Leipsic, in his memoir "*Über die Helligkeitsverhältnisse der Jupiterstrabanten*," taking the star 132 Tauri as 5.3 in magnitude found the respective magnitudes of the satellites

I.	5.52	II.	5.70	III.	5.32	IV.	6.28
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While a reduction of light-comparisons by Prof. Auwers between November, 1858, and May, 1860, gave

I.	6.43	II.	6.59	III.	5.87	IV.	6.76
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BIOLOGICAL NOTES

THE PROGRESS OF EMBRYOLOGY.—The value of Dr. Dohrn's Zoological Station at Naples has never been more conclusively demonstrated than by the publication, in a recent number (July, 1876) of the *Archiv für mikroskopische Anatomie*, of a series of researches by Dr. Bobretzky, of Kiew, on the development of certain forms of Gastropods. The systematic search for embryonic forms which is carried on under Dr. Dohrn's superintendence has enabled Dr. Bobretzky to publish a memoir of great value, illustrated by a hundred figures. His skill and success have been previously attested by his excellent researches on the development of the crustacean genera, *Astacus*, *Palæmon*, and *Oniscus*; and he has now passed with equal good fortune into the Gastropod group, dealing with

the genera *Nassa*, *Natica*, and *Fusus*. These investigations are of special interest because, according to Prof. Ray Lankester, they are the first in which the method of cutting sections has been employed in the examination of these minute eggs and embryos. To have carried the conquests of embryology to such an extent is no slight achievement. Histologists are well aware that the estimate formed of structures by viewing them as transparent objects is liable to be erroneous, even in favourable circumstances; much more so when the objects have an appreciable thickness and are more or less opaque. In all cases it is desirable to obtain, if possible, confirmatory evidence by means of sections cut through hardened specimens; but the labour and manipulative skill required are much greater than in viewing bodies as transparent objects. At the same time Dr. Bobretzky's results convey an instructive warning to those who are tempted to generalise. Nothing is more common, or more detrimental, than for a series of generalisations to be founded on a new set of observations more or less limited in their range. By the continual discovery of fresh variations in the mode in which the ova of aquatic animals are segmented, and acquire their embryonic layers, it is to be hoped that students are being led to see that nothing but summaries of observed facts are of real value at present. Dr. Bobretzky seems to have made it evident that in the genus *Nassa* the three primary embryonic layers are all established during the segmentation of the ovum, and as a direct result of that process; and this is certainly a surprise. Again, a definite relation has been made out in certain cases between the orifice of the earliest invagination of cells and the permanent mouth of the animal. It is to be regretted, however, that Dr. Bobretzky throws doubt on Prof. Lankester's observations on some genera of fresh-water Gastropods, in which facts of a different character were discovered. However, the latter investigator has been stimulated to examine the development of the common *Paludina vivipara* anew, and has published an account of it in the *Quarterly Journal of Microscopical Science* for October last; his previous assertions appear to be very definitely confirmed, notwithstanding that the method of sections has not been adopted: the embryos, it may be stated, are amongst the most transparent in the Gastropod class. Although it must be a disappointment to ardent theorists to find that they are so far from a satisfactory goal, it may encourage young workers when it is seen that the field for independent investigation is practically unlimited, even in embryology. In invertebrates, at least, it appears that the development of every genus should be studied, and that new facts bearing on evolution, on the distribution of life, on the influence of external conditions, on the warping, so to speak, of the direct process of development by temporary influences acting during embryonic life, will reward all diligent work in this fruitful field.

NEW SPECIES OF ECHIDNA.—A very remarkable zoological discovery is announced from Genoa. Among the collections recently received by the Marquis G. Doria for the Museo Civico of that city from Mr. Bruyu, of Ternate, is a specimen of a new and large species of *Echidna* from the Arfak Mountains of New Guinea. As the only two Ornithodelphs hitherto known are exclusively confined to Australia, it is difficult to over-estimate the importance, as regards geographical zoology, of the existence of a third member of this peculiar group of mammals in the adjoining land of New Guinea.

SPHENODON GUENTHERI.—At a recent meeting of the Wellington Philosophical Society (New Zealand) Dr. Buller described a second species of Lizard (if Dr. Günther will allow us to call it so) of the genus *Sphenodon* (sive *Hatteria*). *Sphenodon guentheri*, as Dr. Buller proposes to designate this new form, "after the greatest of living herpetologists," is from the Brother Islands, whilst the original *S. punctatus* appear to be confined to the Karewa Island, in the Bay of Plenty.

A NEW FISH.—Dr. W. Peters has lately communicated to the Royal Academy of Science of Berlin the description of a new fish of the order *Leptocardii*. Of this most peculiar group of "Invertebrated Vertebrates," but one genus—the *Amphioxus branchiostoma*—has yet been recognised, though several more or less doubtful species of the genus from various parts of the world have been described. Dr. Peters has received from Australia several examples of a well-marked, though closely-allied, form, which he names *Epigomethys cultellus*, and which differs from *Branchiostoma* in having a high dorsal fin and in wanting the caudal and anal fins. These minute rarities were dredged up near Peale Island, in Moreton Bay, in eight fathoms water.

A NEW PERIPATUS.—A paper on *Peripatus*, by Capt. F. W. Hutton, Director of the Otago Museum, which will be found to be a valuable supplement to that by Mr. H. Moseley, in the *Transactions* of the Royal Society, has been published in the current number of the *Annals and Magazine of Natural History*. The author describes a new species, which he names *Peripatus novae-Zelandiae*, peculiar in being hermaphrodite. These strange animals, between 1 and 2 inches in length, are found in the West Indies, Chili, the Cape of Good Hope, and New Zealand. They have relations with worms and with the tracheate Articulata, and habits much like those of the wood-louse.

THE PERSIAN DEER.—In the same number of the same journal, Dr. N. Severtzoff has also an interesting communication on the affinities of the Persian Deer (*Cervus maral*), in which he shows that this species is identical with the Wapiti (*C. canadensis*) of Canada, that from the warmer locality changing colour in the summer, that from the colder not doing so. The author very reasonably suggests that the name *C. wapiti* or *C. maral* would be preferable to *C. canadensis*, now the distribution of the species has been shown to be so general.

FISHES OF THE ARALO-CASPIO-EUXINE BASIN.—The results arrived at by Prof. Kessler, after many years' study of the fishes of the Aralo-Caspio-Euxine region (which includes these three interior seas with their affluents) are as follows:—The number of described species is about 280, out of which 80 are marine, 100 fresh-water, and 40 brackish water species; 20 inhabit various waters, and 40 are migratory. 150 species belong exclusively to the region, and 10 have spread out into neighbouring regions at comparatively recent times. Out of the 120 other species, about 25 have a wide range of distribution, about 80 have migrated into the Black Sea from the Mediterranean, and about 15 fresh-water species have penetrated into the Aralo-Caspio-Euxine region from the north. Out of the 160 species limited exclusively to this region, 45 were found in the Black Sea, 54 in the Caspian, and 26 in Lake Aral. There are but 6 species which inhabit simultaneously the three basins of the three interior seas, 4 species which are common to the Caspian and Aral basins, and 25 to those of the Black Sea and the Caspian. The most characteristic families of fishes in the region are the *Gobioidae* and the *Acipenseridae*, the former being represented by less than 50 species, out of which 40 do not extend over other regions; the genus *Benthophilus* of this family, which numbers here six or seven species, has no representatives abroad; and the genus *Scaphirynchus*, represented in the Amu and Syrdarya by three species, is known to have but one more species inhabiting the Mississippi.

DEVELOPMENT OF THE MAMMA.—Among the important histological investigations which have appeared quite recently in one by Mr. C. Creighton, M.B., in the current number of the *Journal of Anatomy and Physiology*, on the development of the mamma, and of the mammary function, in which the view generally received that the mamma is a complex extension downwards of the ectoderm or surface of the skin, is combated in favour of the

account originally given by Goodsir, that the essential secreting structure of the breast develops from a matrix tissue at numerous scattered centres, which are the same from which the surrounding fat originates, and that the ducts arise out of the same matrix tissue by direct aggregation of the embryonic cells along predetermined lines. It is shown that in neither genus of Monotremata does the mamma possess a duct-system, it simply being a follicular gland. In the Cetacea these follicles open into a median unbranched simple duct. In the Marsupials and all other animals the ducts are branched, which causes the organ to be racemose. It may be noted that it was during the prosecution of this investigation that Mr. Creighton was led to the correct determination of the nature of the coagulation-appearances found in mucus and other albuminous fluids.

NOTES

WE regret to announce the death, at Stuttgart, on the 5th inst., of the celebrated traveller and zoologist, Theodor von Heuglin. He was only fifty-two years of age, having been born in 1824, at Hirschlanden, near Leonberg, in Suabia. Von Heuglin had received a comprehensive education and had well prepared himself for his greater travels, by numerous visits to different European countries and by wide study. In 1850 he made a protracted stay in Egypt in order to study oriental languages, manners, and customs. After some visits to the interior of Arabia as well as the east coast of the Red Sea, he became secretary to Dr. Reitz, the Austrian Consul at Khartoum, and in that capacity visited the Upper Nile districts and Abyssinia. When Dr. Reitz had succumbed to the climate, von Heuglin returned to Khartoum, and succeeded him in the consulate. As consul he visited the White Nile, and eventually returned to Germany in 1856. Here he published his excellent "Travels in North-East Africa" (Gotha: Justus Perthes, 1857), which had been preceded (in 1855) by his "Systematic Review of the Birds of Africa." He again paid a visit to the Red Sea, and in 1860 took the lead of the expedition which was to find Vogel's traces, proceeding from the east; Steudner, Kieselbach, Hansal, Schubert, and Munzinger were members of this expedition, which, although acquiring valuable information about the Gallas districts, failed in its principal object. In 1862 von Heuglin returned to Khartoum with Steudner, and in 1863 made a fresh attempt to trace the course of the White Nile. The results of these travels were published in Petermann's *Mittheilungen* (1860-64). His merits were particularly great in ornithology; his drawings are true to nature, his descriptions exact, detailed, and extremely attractive. Also in Arctic regions von Heuglin gave proof of great intelligence and courage; he was almost more successful as an Arctic explorer in 1870 and 1871 than as an African traveller. His work on northern landscapes and animals (published by Westermann, at Brunswick) is one of the most attractive and handsomest records of travels yet published, and is highly esteemed by all who are interested in Arctic exploits. His death was a sadly unexpected one, a slight cough developed into inflammation of the lungs, to which he succumbed in the course of a few days.

WE deeply regret that we have to record the death of Mr. T. Heathcote G. Wyndham. Few among the younger men devoting their life to the pursuit of scientific knowledge and to the teaching of science have formed for themselves a higher ideal of the training a man of science should impose on himself before venturing on original work, or on giving instruction to others. As a commoner of Oriel he took a first class in natural science in 1866, was Burdett-Coutts Scholar in 1867, and was afterwards elected Fellow of Merton. He undertook at Merton the duty of a lecturer in natural science, and the thoughtful care he took in his teaching was not only gratefully spoken of by many of the undergraduates, but frequently referred to in conversation by

those who knew him. The branch of natural science which seemed gradually to have presented itself more prominently to his mind for his own especial study was the chemical side of mineralogy. But although for years he fitted himself for this work in all ways he thought requisite, sparing no pains in acquiring collateral knowledge that might bear on his subject, and though he had done original research which many other men would from time to time have thrown off in isolated papers, he held back from appearing in print. A paper on Idocrase and Garnet and one on Vesuvius are, so far as we know, all he published. But there is a prospect that some of his work will be preserved, as in conjunction with Mr. Gurney he had in hand a small work on chemical mineralogy. Although he had not yet achieved work to make his name marked in the world of science, yet those who knew him lament the loss of a scholar and a gentleman, and the lament is in no way softened by the unhappy circumstances attending his death.

THE published results of the exploration of Lake Titicaca by Messrs. Alexander Agassiz and S. W. Garman, has just reached us. The expedition was undertaken during the early months of last year. Mr. Agassiz writes on the hydrography of the lake, describing the peculiarly uniform temperature at all depths, the potability of the water, the scarcity of the fish—six species only—and its previous greater extent. Mr. J. A. Allen gives a list of the mammals and birds collected, with field-notes by Mr. Garman. Of mammals only ten species were obtained, none new, four being Llamas. Of birds sixty-nine species were collected, including a new *Falcinellus (ridgwayi)*, and a Gallinule (*Gallinula garmani*) closely resembling *G. galeata*. It is noted that many of the species had been but a short time before obtained by Messrs. Bartlett, Whitely, Hauxwell, and Jelski, and described by Messrs. Sclater and Salvin, Cabanis and others. Mr. W. Faxon describes the Crustacea, all excepting a species of *Cypris*, belonging to one amphipodous genus *Allorchestes*, of which seven new fresh-water species are added to the one or two already known. Mr. Agassiz gives a valuable hydrographical map of the lake, and records the presence of corals closely allied to genera living in the West Indies at the height of 2,900 feet above the level of the sea.

MESSRS. CHURCHILL have just published a third edition of Mr. Sutton's "Systematic Handbook of Volumetric Analysis," in which the author has embodied "all such novelties and modifications as experiment have proved to be worthy of notice."

WE have to announce with great regret the death of another martyr to science. In a letter, dated September 15, the Rev. S. McFarlane writes from Somerset, Cape York: "We have just heard of the massacre of Dr. James and his partner, a Swede, at Yule Island by the natives of New Guinea. They had gone in their large boat to the east side of Hall Sound to shoot birds of Paradise, when they were attacked by three canoes, and both white men were killed. The native crew managed to get away in the boat, and brought the sad news here." Dr. James was a young American who had been collecting objects of natural history in Yule Island and on the opposite shores of New Guinea. His first collections arrived in this country about a fortnight ago, having been sent over by his friend, Dr. Alfred Roberts, of Sydney, to whose liberality the expedition was greatly indebted. The excellent way in which the specimens are preserved and the careful notes given by the collector show that Dr. James was enthusiastic in his work, and it is melancholy to think that so promising a scientific career has been thus prematurely cut short. A description of the collection of birds formed by the late traveller will be given by Mr. Bowdler Sharpe at an early meeting of the Linnean Society, in continuation of the articles on the